Climate Change, Water Governance, And Environmental Justice: A Legal Perspective

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Abstract
Climate change is altering rainfall patterns, glacial melt, drought severity, and water quality faster than most legal systems were designed to handle. These physical shifts land on a legal architecture built for a stable hydrological past and on a social landscape where water risks already fall unevenly across class, race, and geography. This paper examines the legal relationship between climate change, water governance, and environmental justice. It reviews the international and domestic frameworks that govern freshwater resources, traces the legal foundations of environmental justice, and compares judicial decisions from South Africa, Pakistan, the Netherlands, and the United States to show how courts are beginning, unevenly, to connect these themes. The paper argues that water law remains largely separated from climate law, that enforcement of the human right to water is weak, and that procedural protections for marginalized communities are often symbolic rather than substantive. It closes with reforms, including climate resilient minimum water standards, expanded public trust doctrine, and stronger participatory rights, aimed at making water governance both more resilient and more just.

Keywords*:* climate change, water governance, environmental justice, human right to water, climate litigation, public trust doctrine

Introduction

Water law in most countries was written for a climate that no longer exists. River agreements, groundwater permits, and municipal supply systems assume that past rainfall and flow patterns are a reasonable guide to the future. The Intergovernmental Panel on Climate Change reports that the global water cycle is intensifying, producing heavier rainfall and flooding in some regions and deeper, longer droughts in others, while glacier and snowpack loss is reducing the reliability of rivers that hundreds of millions of people depend on (IPCC, 2022). Sea level rise is pushing saltwater into coastal aquifers, and warming is degrading water quality even where quantity is not yet a problem.

These changes do not fall evenly across the population. Communities with weaker infrastructure and less political power tend to absorb a disproportionate share of water related climate harm. The Flint, Michigan water crisis shows the pattern clearly even without a direct climate trigger: a predominantly Black, low income city received unsafe water for months before regulators acted (Butler et al., 2016). The same dynamic repeats in drought stricken farming regions, informal settlements, and small island states. Environmental justice scholarship has named this pattern for decades, but law has been slower to respond, particularly where water governance and climate law are treated as separate fields. This paper asks how law should respond when climate change, water insecurity, and social disadvantage converge in the same place. It first outlines how climate change is reshaping water governance, then reviews the international and domestic legal frameworks currently in place, then traces the legal foundations of environmental justice, then compares judicial decisions from four jurisdictions, and finally identifies gaps and proposes reforms.

Climate Change and the Transformation of Water Governance

Water law generally assumes hydrological stationarity, the idea that historical rainfall and flow patterns will continue with only minor variation. Permitting systems and water sharing agreements are built on fixed allocations and dependable supply targets that depend on this assumption. The IPCC's Working Group II report makes clear the assumption no longer holds, since climate change is intensifying both extremes of the water cycle and reducing the meltwater that sustains many major rivers during dry seasons (IPCC, 2022).

The legal consequences are significant. Allocation regimes that divide a river's flow in fixed shares become unworkable when flow itself becomes unpredictable. Infrastructure built to historical flood standards may now be inadequate, exposing both communities and the agencies that built to that standard to greater risk. Groundwater law,

which often treats aquifers as static reserves, is under similar strain as drought drives heavier reliance on groundwater even as recharge falls. None of this makes existing water law irrelevant, but it does mean the law's core assumptions need updating, and that the people most exposed to the resulting instability need a voice in how that update happens.

Legal Foundations of Water Governance

International Frameworks

International freshwater governance combines treaty law, human rights instruments, and soft law guidance. The 1997 United Nations Convention on the Law of the Non-Navigational Uses of International Watercourses sets out principles of equitable and reasonable use and a duty not to cause significant harm to other watercourse states, but it was drafted for interstate equity rather than climate adaptation and says little about managing shared basins once historical flow data becomes unreliable. Human rights law fills part of this gap. In 2010 the United Nations General Assembly adopted Resolution 64/292, recognizing the right to safe drinking water and sanitation as essential to the full enjoyment of life (United Nations General Assembly, 2010), and the Committee on Economic, Social and Cultural Rights had already given that right content through General Comment No. 15. Neither instrument creates a binding enforcement mechanism, leaving implementation to domestic systems of widely varying capacity.

Governance guidance has developed alongside these rights instruments. The OECD Principles on Water Governance, adopted in 2015, set out twelve recommendations organized around effectiveness, efficiency, and trust and engagement, urging governments to clarify roles, use reliable data, and genuinely involve affected stakeholders in decisions (OECD, 2015). The Principles are not binding, but they have shaped national reform processes. Climate treaty law sits beside, rather than inside, this architecture: the Paris Agreement requires parties to strengthen adaptive capacity, yet contains no water specific obligations and does not require alignment between climate and water law.

Domestic Frameworks

Domestic water law shows similar fragmentation, though some doctrines can bridge it. The public trust doctrine, traced in modern form to Joseph Sax's influential 1970 article, holds that certain natural resources are held by the state in trust for the public and cannot be mismanaged to the public's detriment (Sax, 1970). Some advocates now argue the doctrine should include a duty to protect water resources from climate driven degradation. Constitutional rights provide another pathway: South Africa's Constitution guarantees everyone access to sufficient water, while the United States has no express constitutional right to water, leaving access to a patchwork of federal statutes, chiefly the Safe Drinking Water Act, layered over state water rights systems built largely for nineteenth century agricultural and mining use.

Environmental Justice: Conceptual and Legal Foundations

The environmental justice movement emerged in the United States in the early 1980s from community resistance to hazardous waste siting in predominantly Black and low incomeneighborhoods. Robert Bullard's Dumping in Dixie documented how waste sites in the American South clustered around African American communities and argued the pattern reflected land use decisions and uneven enforcement of environmental law rather than coincidence (Bullard, 2000). The claim widened over time into a broader argument that environmental burdens and benefits, including access to clean water, are distributed unequally along lines of race, class, and geography, and that this distribution is itself a matter of justice.

Scholars typically separate the concept into three dimensions: distributive justice, concerned with how environmental goods and harms are allocated; procedural justice, concerned with who gets a meaningful say in decisions that affect them; and recognition, concerned with whether a community's history and relationship to the environment are acknowledged at all. A water system can fail on one dimension while succeeding on the others, for example distributing water evenly while excluding residents from decisions about pricing or infrastructure. In the United States this concept gained formal status through Executive Order 12898, issued in 1994, directing federal agencies to identify and address the disproportionate environmental effects of their programs on minority and low income populations. The order creates no private right of action, but it remains one of the few instruments anywhere that names environmental justice directly in a binding governmental directive. Outside the United States, such claims are more often litigated indirectly, through rights to life, dignity, or a healthy environment, as the cases below illustrate.

Where the Three Fields Meet

Climate change, water governance, and environmental justice intersect where a changing hydrology collides with a legal system never designed for equity. Climate driven scarcity or contamination tends to expose, rather than create, existing weaknesses in water infrastructure, and those weaknesses concentrate in communities with the least capacity to demand repair. The legal tools used to respond, emergency statutes, drought restrictions, infrastructure financing, are usually designed and applied at some distance from affected communities, weakening procedural justice even when the outcome is eventually corrected, and formal recognition of a right to water does not by itself guarantee fast or full enforcement for the populations who need it most.

Flint illustrates this convergence without a direct climate trigger. When the city switched its water source in 2014 to cut costs, corrosive river water leached lead from aging pipes, and residents experienced lead poisoning and a bacterial outbreak before officials acknowledged the scale of the problem (Butler et al., 2016). Residents had warned of

discolored, foul smelling water for months beforehand, and the city's demographic profile matched a long pattern of environmental injustice research connecting race, poverty, and exposure to environmental hazards. As drought and heat place growing stress on aging systems elsewhere, Flint offers a preview of how climate stress could compound existing infrastructure neglect in other low income communities.

Climate driven stress sharpens the same dynamics elsewhere. Farmers without secure water rights are often first to lose access when allocation systems come under pressure, indigenous communities whose water use rests on customary arrangements frequently find those arrangements unrecognized by formal law, and coastal communities facing saltwater intrusion often have the least capacity to finance adaptation despite contributing least to the emissions driving the change. None of the frameworks reviewed above were built with climate instability and structural inequality addressed together.

Judicial Responses: A Comparative View

Courts in several jurisdictions have begun, with varying success, to connect water rights, climate obligations, and equity.

South Africa: Mazibuko v City of Johannesburg

In Mazibuko, residents of Phiri, a Soweto township, challenged Johannesburg's free basic water policy and its prepaid water meters, arguing the policy failed the constitutional right of access to sufficient water (Mazibuko v City of Johannesburg, 2009). The Constitutional Court held that the right did not require water on demand in unlimited quantity, but obligated the state to take reasonable measures, within available resources, to progressively realize the right, and it declined to fix a quantitative content for sufficiency. The decision confirmed the right is justiciable but left Phiri residents without a concrete remedy, showing how constitutional water rights can be vindicated in principle while leaving distributive disparities largely unaddressed.

Pakistan: Leghari v Federation of Pakistan

Leghari arose when a Punjab farmer sued federal and provincial governments for failing to implement Pakistan's National Climate Change Policy, arguing that resulting flood, drought, and water insecurity violated his rights to life and a healthy environment (Leghari v Federation of Pakistan, 2015). The Lahore High Court agreed, grounding its reasoning in the public trust doctrine, the precautionary principle, and intergenerational equity, and it created a Climate Change Commission to monitor compliance. Leghari treats climate adaptation, water security, and constitutional rights as a single legal question rather than three separate ones.

The Netherlands: Urgenda Foundation v State of the Netherlands

Urgenda and a large group of citizens sued the Dutch government, arguing its emissions targets were inadequate under domestic tort law and under Articles 2 and 8 of the European Convention on Human Rights, protecting life and private and family life (Urgenda Foundation v State of the Netherlands, 2019). The Dutch Supreme Court upheld an order requiring a twenty five percent emissions cut below 1990 levels by the end of 2020. The case is not a water case on its face, but its core reasoning, that inadequate climate mitigation can itself violate established human rights, has been invoked in arguments that climate driven water insecurity could similarly breach rights to life or family life.

United States: The Flint Water Crisis

Flint did not produce a single landmark constitutional ruling. Instead it generated criminal charges against state officials, civil litigation under the Safe Drinking Water Act and state tort law, and extensive scholarly description of the episode as regulatory failure and environmental injustice operating together (Butler et al., 2016). Without a strong constitutional water right, residents relied on statutory and tort claims that moved more slowly and produced a less structural remedy than the South African or Pakistani courts were able to order.

Read together, these cases show courts increasingly willing to treat water security as a rights question and climate inaction as a legal failure, but constrained by the doctrinal tools each jurisdiction provides. Constitutional rights give courts a textual hook but can be applied with heavy deference, public trust and intergenerational reasoning allow more assertive intervention but depend on doctrines not recognized everywhere, and jurisdictions without a constitutional water right are left to slower statutory enforcement.

Gaps in the Current Legal Framework

Several gaps emerge from this analysis. The first is doctrinal fragmentation: climate law and water law develop along separate tracks, so a state can meet its climate obligations while its water allocation law remains unadjusted for a changing baseline, and vice versa. The second is weak enforcement of the human right to water, which lacks a binding international mechanism and depends on domestic courts that, as Mazibuko shows, may interpret the right narrowly even where it is constitutionally entrenched. A third gap concerns data and recognition: effective governance requires disaggregated data on who has safe water access and who does not, yet many utilities do not collect or publish it in a form supporting an environmental justice analysis, and customary or indigenous water rights remain largely invisible to formal allocation systems even though climate driven scarcity often hits those communities first. A final gap is

procedural, since participation requirements are frequently satisfied through formal notice and comment processes that low income and rural communities may lack the resources or trust to use effectively.

Toward a Justice-Centered Approach to Water Governance

Closing these gaps requires reform at both levels. Internationally, climate adaptation finance should be explicitly linked to water governance reform, so that infrastructure funding carries conditions requiring equitable access and genuine community participation, and the OECD Principles could add an explicit climate resilience criterion alongside effectiveness, efficiency, and trust, asking whether a country's water institutions can withstand a changing hydrological baseline (OECD, 2015).

Domestically, the right to water needs an enforceable minimum core, a baseline quantity and quality the state must guarantee regardless of broader resource constraints, paired with a climate adjustment mechanism that revises that baseline as local hydrology changes. This would address the central weakness in Mazibuko, where the Court declined to fix a quantitative content for sufficiency. Expanding the public trust doctrine, as in Leghari, offers a complementary tool in jurisdictions without an express constitutional water right (Sax, 1970; Leghari v Federation of Pakistan, 2015).

Procedural reform matters equally. Utilities and regulators should be required to publish access, quality, and affordability data disaggregated by income, race, and geography, formal recognition of customary and indigenous water rights within national allocation systems would close a persistent recognition gap, and resourced participation requirements, rather than notice and comment alone, would give the people most exposed to climate driven water stress a genuine voice in allocation and infrastructure decisions. None of these reforms is radical individually; what is missing is their integration into one coherent response to a problem that is at once hydrological, legal, and social.

Conclusion

Water law was built for a climate that no longer exists, and environmental justice has not yet been fully absorbed into either water law or climate law as a binding obligation. The cases examined here, from Johannesburg to Punjab to The Hague to Flint, show courts experimenting with different doctrinal tools to bring water security, climate accountability, and equity into the same legal frame, with real but uneven success. Linking adaptation finance to equitable water governance, giving the right to water an enforceable and climate adjusted minimum content, expanding public trust principles, and building genuine participation into water decisions are reforms available now, using tools that already exist somewhere in the world. What remains is to connect them, so that law responds to climate change and inequality together rather than as two problems arriving at different desks.

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